

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

"Electric Torch for Divers".

We, LA SPHEROTECNIQUE, a Company organized under the laws of France, of 6 rue Cognac-Jay, Paris, France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to electric torches for divers of the kind in which a water-tight unit comprising a light bulb with its reflector and lens, is mounted in one open end of a cylindrical housing for containing cell elements, so as to be rotatable in said end for switching on and off the feeding electric circuit of the light bulb. The absolute water-tightness between surfaces relatively movable in rotation and, in the present case, between the surfaces in contact with the movable elements of the device which make it possible to control the cut-off switch for the lamp from the outside, raises a delicate problem, poorly solved heretofore or solved at the cost of complicated devices which are costly and uncertain in operation.

The invention has for its primary object to provide an electric torch of the above kind, but in which the water-tightness is ensured even when diving at great depths where the water pressure reaches 70 pounds per square inch and more, whilst allowing the rotatable unit to be easily rotated by the diver.

To this end, the electric torch according to the invention is characterized in that said unit is provided with an axial trunnion which enters with a clearance the open housing end and which has at least one peripheral groove for locating a circular-section resilient sealing ring, said trunnion being held in the axial direction in the housing by projections which engage the trunnion and are situated on the housing between the last resilient sealing and the

outer edge of the housing open end.

Other advantageous features of the invention will appear from the following description and drawings in which:

Figure 1 is an axial section of a lamp according to the invention.

Figure 2 is a cross-section along the line II-II of Figure 1.

The handle or body of the torch is, in the manner commonly adopted, constituted by a tube 1, of metal or any other suitable material, with a thickness designed for withstanding the immersion pressures, but said tube is blind and closed permanently at one end, for instance by means of a brazed or soldered bottom 2 providing absolute water-tightness. The tube contains the usual dry cell battery 3 for this type of lamp, resting on a spring 4 which at the same time ensures electrical contact between the battery and tube when the latter is made of metal, which is the case in the embodiment described. The introduction of the cell elements 3 into the tube is effected through the upper tube end remote from the bottom 2, the upper end being open.

The open tube end is closed, after insertion of the cell elements, by a trunnion 5 which is part of an assembly constituting a lighting projector with its electric lamp or bulb 6 and its associated elements and with a switch controlling the power supply circuit for the lamp. In the embodiment shown, the trunnion 5 constitutes an axial tubular extension of a rigid shell 7, made of any suitable material and sealed against water by a glass pane or lens 8. The fastening for the pane 8 also serves to secure a reflector in position and is provided by a ring 10 which is screwed on a screw thread 11 provided externally around the mouth of shell 7. The fastening is made water-tight by plastic joint rings 12.

Water-tightness between the trunnion 5 and the tube 1 is ensured by at least one

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joint ring 13 of the resilient-circular-section type, mounted in a peripheral groove 14 of the trunnion 5 so as to be held permanently thereon. This joint ring 13, offers, in its application to the invention, the twofold advantage of ensuring an absolute water-tightness at all possible depths of immersion and of not offering excessive passive resistance to the rotation of the trunnion 5 in the tube 1. This rotation may thus be effected easily by hand by gripping the ring 10 by its periphery, which may be knurled.

It may be noted that the joint ring 13 does not prevent the entrance of water between the trunnion and tube in the narrow annular space located upstream with respect to this joint ring. This offers no drawback since the water cannot flow past the joint ring 13 for entering inside the tube 1 and the hollow trunnion 5 for reaching the elements of the projector.

The lamp or bulb 6 screws, by its base, in a conducting socket 15 mounted in the trunnion 5 so as to be able to slide axially therein, but with no possibility of rotating with respect to this trunnion. To this end, in the example of embodiment contemplated, the socket 15 is provided with radial fingers 16 which engage corresponding longitudinal slots 17 of the trunnion. These fingers 16 pass through bulical slots provided in the side wall of a cylindrical guide 18 loosely fitted in the axial bore of the trunnion 5. A relative angular motion of the trunnion and guide 18 thus causes the axial displacement of the socket 15 and lamp 6.

The guide 18 is provided with means for preventing its relative rotation with respect to the tube 1 and, in the embodiment shown, these means act by friction and consist in a base, resiliently deformable and preferably consisting of a washer 19 of rubber or equivalent material armoured with one or more layers of metal gauze. This washer 19 is secured to the guide 18 by its central portion, between a collar 20 of said guide and a flange 21 of a plug 22 of insulating material forced into the guide 18. This plug 22 carries a terminal 23 arranged axially and consisting, for example, of a tubular body in which a small plunger 24 slides, the plunger being urged outwardly by a spring.

When the cell elements 3 have been introduced in the tube 1, the whole of the projector with all the elements just described is mounted by entering the trunnion 5 in the open end of the tube. Said trunnion is then locked in the axial direction but so as to remain free for rotating. To this end there is provided, in the example shown, a resilient locking clip constituted by pincers 25 made of steel wire. Each branch of the clip offers a projection or

protruding portion 26, which passes through an underlying aperture 27 in the wall of the tube 1 and enters an annular groove 28 around the trunnion 5. A wrist strap may be attached to these pincers, making it possible to hang the torch from one wrist of the diver. The spring 4 ensures the contact with the body of one terminal of the battery, the other terminal of the battery being held in contact with the terminal 23 insulated from the body. By rotating the trunnion 5 in one or the other direction with respect to the guide 18 held fixedly with respect to the tube 1 due to the adherence of the washer 19 with the latter, the lamp is moved farther away from or closer to the plunger 24 for extinguishing or lighting purposes. The resilient mounting of the plunger 24 makes it possible to vary the position of the lamp filament with respect to the focus of the reflector 9, while preserving the contact between the insulated pole of the lamp and the plunger, for varying at will the angle of aperture of the light beam issuing from the torch.

What we claim is:—

1. An electric torch for divers, of the kind in which a water-tight unit, comprising a light bulb with its reflector and lens, is mounted in one open end of a cylindrical housing for containing cell elements, so as to be rotatable in said end for switching on and off the feeding electric circuit of the light bulb, characterized in that said unit is provided with an axial trunnion which enters with a clearance the open housing end and which has at least one peripheral groove for locating a circular-section resilient sealing ring, said trunnion being held in the axial direction in the housing by projections which engage the trunnion and are situated on the housing between the resilient sealing ring and the outer edge of the housing open end.

2. An electric torch for divers, according to Claim 1 characterized in that the housing projections for engaging the trunnion are provided on a resilient clip which encircles the housing and has protruding portions which pass through apertures in the wall of the housing and enter an annular groove around the trunnion.

3. An electric torch for divers, according to Claim 1, characterized in that the trunnion is hollow and contains a guide for an axially movable socket for the light bulb, said guide being provided with a base the side edge of which bears resiliently against the inner surface of the cylindrical housing so that the guide is held against relative rotation with respect to the housing when the projector and associated trunnion are rotated, the relative angular motion of this projector and guide being used for

controlling the switching operation.

4. An electric torch for divers substantially as hereinbefore described and illustrated in the accompanying drawing.

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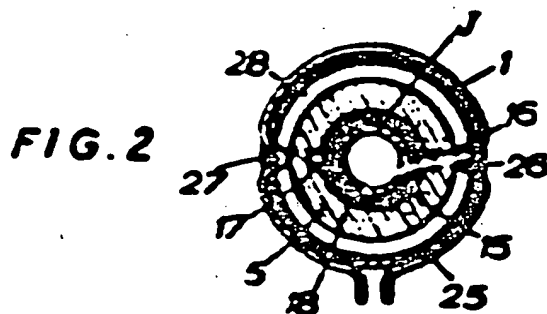
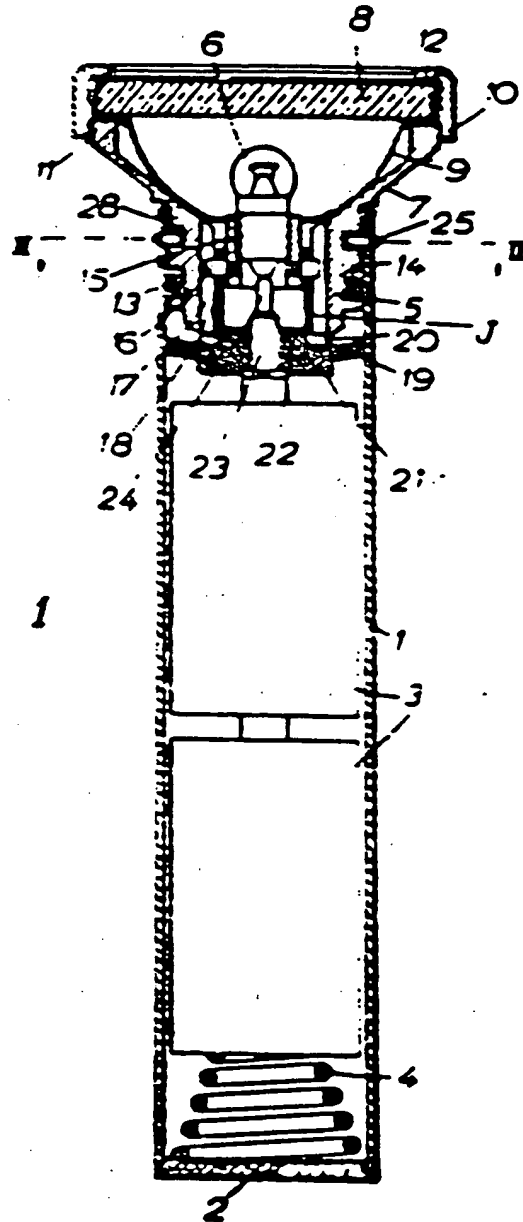
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1 SHEET

COMPLETE SPECIFICATION

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